



Written Debrief Materials: Overview

For Concept Study Reports Submitted to

Announcement of Opportunity #NNH07ZDA003O

Small Explorers and Missions of Opportunity

Release date: September 28, 2007

GROUND RULES FOR THE DEBRIEFING

- This debriefing is a service to the study team to provide constructive feedback on the findings of the evaluation process. No debate of these findings is expected/permitted.
- The debriefing will cover your Concept Study Report ONLY and we will not comment about findings with regards to other CSRs.
- Questions may be asked at any time, however, the debriefing period is limited, therefore, to assure that all findings are covered, all participating will need to be disciplined about the pace of progress.
- One and only one debriefing per team will be given and only in rare cases will questions be answered or actions be completed at any later time than at the debriefing.
- We will provide ALL findings and the TMC Risk Rating. These will be the findings of MANY people (not the Program Officer's or that of the Chairs of the TMC or Science panels): There were approximately 35 people (~30 people in the SMEX TMC review and ~5 people in the science review) involved in producing the findings that will be related to you at this debriefing.
- We will read the findings; notes may be taken; a hard copy of these debrief materials will be provided to you. No recording devices are allowed.
- Please be aware that it is our intention that the debriefings (except for findings) be identical for all concept study teams in all respects to the extent possible.

INTRODUCTION TO THE EVALUATION PROCESS

One of the most important Science Mission Directorate (SMD) activities covered by the NASA *SMD Management Handbook* is the solicitation and selection of research investigations for NASA funding. SMD solicits proposals for basic research investigations using Broad Agency Announcements (BAAs); the most common BAAs are the Announcement of Opportunity (AO) and the NASA Research Announcement (NRA), while less frequent is the NASA Cooperative Agreement Notice (CAN). The distinguishing characteristic of all NASA BAAs is that they solicit ideas for basic research investigations, the end result of which is new knowledge and data that are to be made publicly available.

The document that describes the Announcement of Opportunity process is the NASA FAR Supplement (NFS) part 1872.0, entitled "Acquisition of Investigations," which is complete and fully applicable. The NASA FAR Supplement is a component of the Federal Acquisition Regulations (FAR) System, which codifies and publishes uniform policies and procedures for use by all executive agencies in acquiring goods and services. All SMD AO processes are conducted in accordance with the FAR and with NFS 1872. In addition to this authority, the flow of activities and SMD policies involved in the process by which the SMD generates and issues AOs and reviews and selects submitted proposals is found in the *SMD Management Handbook*. The Small Explorer (SMEX) and Missions of Opportunity (MO) selection process for SMEX and MO missions was conducted in accordance with these Federal regulations and SMD policies.

On May 28, 2008, NASA selected six candidate mission proposals for further evaluation from the 32 compliant SMEX proposals submitted in response to the AO. These were:

- Coronal Physics Explorer (CPEX), Principal Investigator Dennis G. Socker, Naval Research Laboratory, Washington, D.C.
- Gravity and Extreme Magnetism SMEX (GEMS), Principal Investigator Jean H. Swank, Goddard Space Flight Center, Greenbelt, Md.
- Interface Region Imaging Spectrograph (IRIS), Principal Investigator Alan M. Title, Lockheed Martin Space Systems Co., Palo Alto, Calif..
- Joint Astrophysics Nascent Universe Satellite (JANUS), Principal Investigator Peter W.A. Rosing, Pennsylvania State University, University Park, Penn.
- Neutral Ion Coupling Explorer (NICE), Principal Investigator Stephen B. Mende, University of California, Berkeley, Calif.
- Transiting Exoplanet Survey Satellite (TESS), Principal Investigator George R. Ricker, Massachusetts Institute of Technology, Cambridge, Mass

On June 20, 2008, NASA selected two science proposals from the 17 compliant MO proposals submitted, to be its next Explorer Program Mission of Opportunity investigations. The first mission was selected to proceed for development, while the second was selected for a concept study. The two missions respectively were:

- High-Resolution Soft X-Ray Spectrometer (SXS) for NEXT, Principal Investigator Richard L. Kelley, Goddard Space Flight Center, Greenbelt Md.
- Global-scale Observations of the Limb and Disk (GOLD), Principal Investigator Richard Eastes, University of Central Florida, Orlando, Fla.

All PI's were debriefed at a kickoff meeting to initiate Phase A concept studies. On December 15, 2008, Concept Study Reports (CSR) were received by NASA.

OVERVIEW OF THE EVALUATION AND SELECTION PROCESSES

NASA takes seriously its responsibility for ensuring that CSR's are treated with the utmost confidentiality and are evaluated fairly and objectively without actual or apparent conflict of interest on the part of the reviewers. Therefore, it is NASA policy that NASA Civil Service personnel are in charge of and direct all aspects of the evaluation and, including the identification and invitation of peer review personnel, in-person monitoring of the deliberations of any peer review panel, and the adjudication of conflicts of interest that may be declared by participating program, project or panel personnel.

The Evaluation and Selection processes are shown in Figure 1. These processes were managed by the Explorer Program Scientist, who served as the NASA Program Officer. Implementation was managed by the SMEX and Mission of Opportunity Acquisition Managers in the Science Support Office (SSO) of the NASA Langley Research Center. The SMEX CSRs and the MO CSR were evaluated by independent panels.

SMEX CSR Evaluation Flow

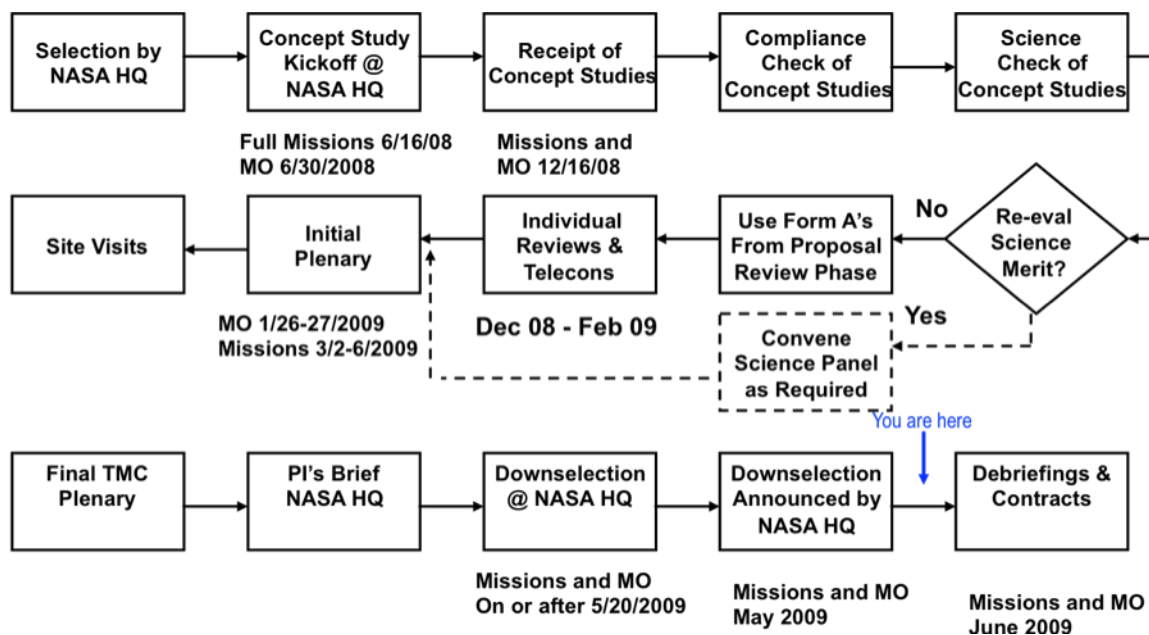


Table 1

EVALUATION PROCESS

All CSRs were evaluated against the criteria given in the [SMEX Guidelines and Criteria for the Phase A Concept Study](http://explorers.larc.nasa.gov/smexlib.html) document (hereafter the Guidelines); <http://explorers.larc.nasa.gov/smexlib.html>), by panels of individuals who are scientific and/or technical peers of the concept study teams. The evaluation criteria were grouped as follows:

- Scientific Merit;
- Scientific Implementation Merit, including technical merit; and
- Technical, Management, and Cost (TMC) feasibility, including cost risk.

In addition, as stated in the Guidelines, the Education and Public Outreach (E/PO) component of the CSRs was evaluated against the E/PO evaluation criteria, and comments provided. If a Student Collaboration was proposed, its separability was evaluated by the TMC team, science merit by the science panel, and E/PO merit by the E/PO panel.

NASA HQ Discipline Scientists reviewed the scientific content of the CSRs and determined that the scientific goals of the investigations stated in the CSRs were unchanged from those stated in the original proposals. The scientific merit of the CSRs was, therefore, not re-evaluated. The remaining two criteria as well as E/PO and SC were re-evaluated. The science panels were managed by HQ Discipline Scientists, while the TMC panels were managed by the SMEX and MO Program Officers and Acquisition Managers. Reviewers were selected based on their known expertise relevant to the content of each CSR and avoidance of conflicts of interest. At least one evaluator from each science panel participated in all TMC discussions, and a science instrument evaluator from each science panel was the instrument expert for that CSR on TMC. The TMC lead attended (as an observer) the science panel discussions and provided input only if required.

Reviewers were instructed to judge the CSRs against the stated evaluation criteria and not to compare CSRs to which they had access, even if they proposed similar science. NASA instructed all reviewers to base their comments on the specified evaluation criteria, to maintain confidentiality of their activities and of all CSRs and review materials provided to them, to avoid any activities that may have led to actual or apparent conflicts of interest, and to report any actual or apparent conflicts as became known to them during the course of the review activities. All reviewers not employed by the U.S. Government submitted a signed *Nondisclosure Agreement* before they were allowed to review any CSR.

SPECIFIC EVALUATION PROCESSES

The CSR's were provided to all reviewers and the panelists given an opportunity for individual reviews and telecons. This was followed by an initial plenary, the purpose of which was to identify significant issues based on the initial evaluation of the CSR. Questions for the concept study teams are generated and/or refined for all significant issues to give the study teams an opportunity to clarify any misunderstanding. Questions were sent to each team 8 days prior to the Site Visit. The information presented during the Site Visit and contained in the CSR was considered during the final evaluation. Final reports were prepared at a Final Plenary.

Scientific Implementation Evaluation Plenary Process:

There were seven panels, one for each CSR. Each panel was monitored by a Discipline Scientist, who was the NASA Program Officer (PO) responsible for the panel. All the PO's were Civil Servants. The PO's ensured that the panel had the required expertise to provide all CSRs a fair and equitable review. The TMC lead attended the science panel as an observer and provided input as required. During the panel review, each CSR was evaluated against the criteria given in the Guidelines. The panel developed strengths and weaknesses for each CSR and prepared a report reflecting the panel findings. A summary rationale for the evaluation was also developed.

Principles for TMC Evaluation:

Basic Assumption: The study PI is the expert on his/her mission. For each CSR, at least one science panel evaluator participated in all TMC discussions. Science instrument evaluators from the each science panels were utilized as the science instrument experts on TMC.

- TMC: Task is to try to validate CSR's assertion of Low Risk.
- Study Team: Task is to provide evidence that the project is Low Risk.

All CSRs were reviewed to identical standards.

- The TMC process is used by SSO to support all SMD evaluations with a standard process.
- Evaluation Plan approved by NASA Headquarters and in place before CSR's arrive.
- All CSRs receive same evaluation treatment in all areas and by all reviewers.

TMC Findings are those of the entire TMC panel.

- Findings that are above expectations are documented as strengths. Findings that are below expectations are documented as weaknesses. Findings that are as expected are not documented.
- Specialist reviewers provided findings but did not vote for Risk ratings.
- Final ratings were agreed to, in plenary, by way of individual voting. The final rating was found by polling the TMC members for their vote. The rating was the MEDIAN of the votes; it did NOT require unanimous agreement.

TMC Risk Rating:

The TMC evaluation is to determine the level of risk of accomplishing the scientific objectives of the investigation, as proposed, on time and within cost. Figure 2 illustrates the type of risks that are, and are not, evaluated by the TMC panel.

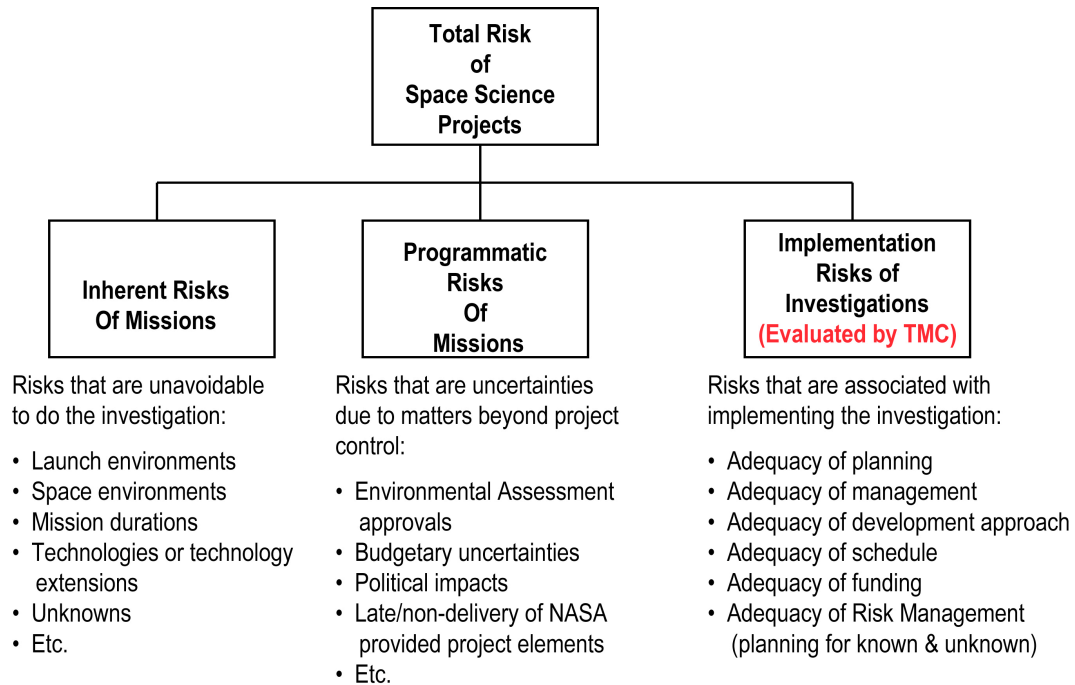


Figure 2: Categories of risk that are evaluated by the TMC processes

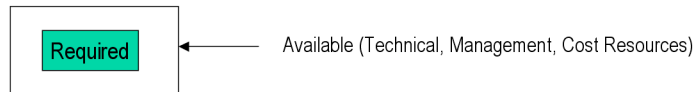
The TMC evaluation results in a narrative text, as well as a TMC grade. There are three possible TMC grades: Low Risk, Medium Risk, and High Risk. These rates are illustrated as an “envelope” concept in Figure 3.

- **Low Risk:** There are no problems in the CSR that cannot be normally solved within the time and cost proposed. Problems are not of sufficient magnitude to doubt the study PI’s capability to accomplish the investigation. “Envelope more than adequate”
- **Medium Risk:** Problems have been identified, but are considered within the CSR team’s capabilities to correct with good management and application of effective engineering resources. Technology may not be ready, but available time and money should get it there. Investigation may be complex and resources tight. “Envelope adequate but tight”
- **High Risk:** Problems are of sufficient magnitude such that failure is highly probable. “Envelope inadequate”

TMC Risk Envelope Concept

Envelope: All TMC Resources available to handle known and unknown development problems that occur. Includes schedule and funding reserves; reserves and margins on physical resources such as mass, power, and data; descope options; fallback plans; and personnel.

Low Risk: Required resources fit well within available resources.



Medium Risk: Required resources just barely inside available resources. Tight, but likely doable



High Risk: Required resources DO NOT fit inside available resources. Expect project to fail

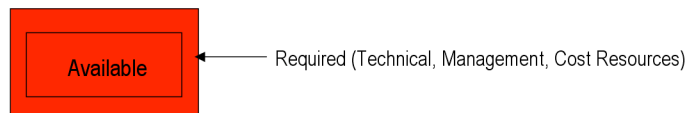


Figure 3: TMC Envelope Concept: Includes all TMC-criteria Resources available to handle known and unknown development problems that occur. Includes schedule and funding reserves; reserves and margins on physical resources such as mass, power, and data; descope options; fallback plans; and personnel

TMC Evaluation considerations generally include the following items:

Instrument: Instrument Design, Accommodation, and Interface, Design Heritage Environment Concerns, Technology Readiness, Instrument Systems Engineering

Mission Design and Operations (N/A for MO's): Mass Margins, Trajectory Analysis, Launch Services, Concept of Mission Operations, Ground Facilities–New/Existing, Telecom

Flight Systems: Hardware/Software Design, Design Heritage, Spacecraft Systems Design, Design Margins (Excluding mass), Qualification and Verification, Assembly, Test, and Launch Operations, Mission Assurance, Development of New Technology

Management, Organization, & Schedule: Management and Schedule, Roles and Responsibilities, Team Experience and Key Individuals Qualification, Project Management and Systems Engineering, Organizational Structure and Work Breakdown Schedule (WBS), International Participation, Risk Management, Including Descope Plan and Decision Milestones, Project-Level Schedule, Proposed Subcontracting Plans and SDB Participation.

And **Cost**.

Cost Analysis:

An initial cost analysis was accomplished based on information in the CSR (consistency, completeness, proposed basis of estimate, contributions, use of full cost accounting, maintenance of reserve levels, and cost management, etc.). Figure 4 illustrates the process and elements that make up the TMC cost assessment.

- Several independent cost models were used to analyze proposed cost.
- The cost threats, risks, and risk mitigation analysis were analyzed.
- All information from the entire Evaluation Process provided the final assessment.

Cost Realism is only reported as a Cost Risk based on Models, Analogies, Heritage, and Grass Roots information from CSRs. Cost evaluation is INPUT to TMC risk rating; it is not a separate element.

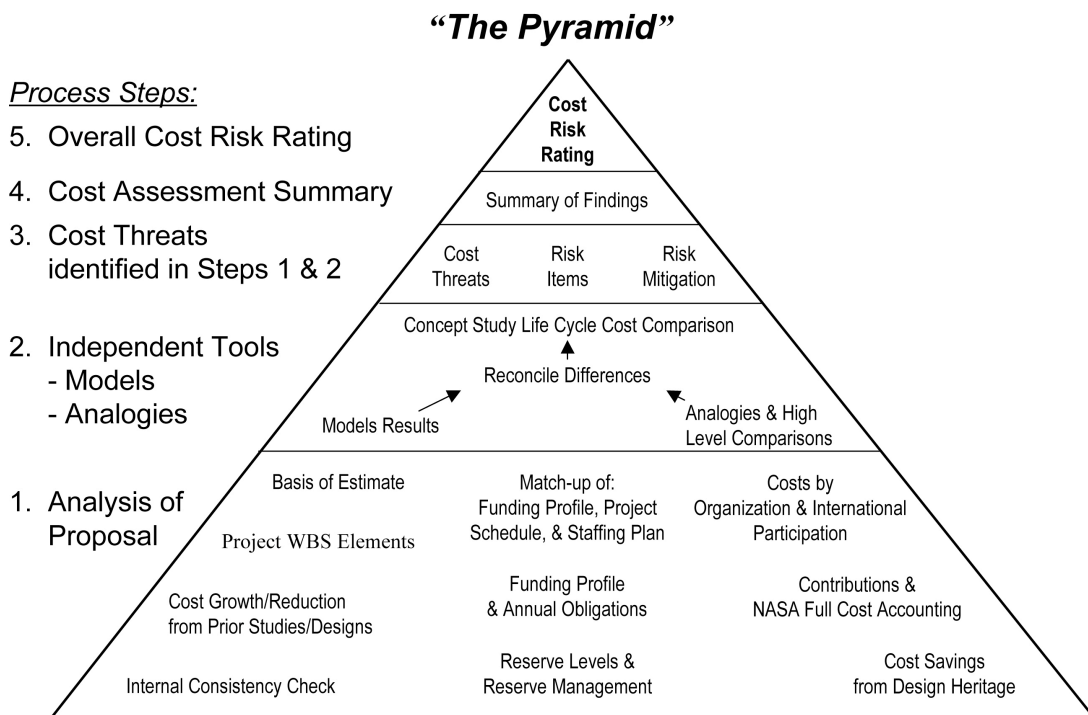


Figure 4: Processes and elements contributing to the TMC Cost Assessment.